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Using attribute-based costing techniques to reduce costs: An applied study in the Kufa cement factory

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Abstract : Most Iraqi companies suffer from high costs of their products, and they lack the application of modern methods in measuring and determining costs, and they lack the use of contemporary cost techniques that would reduce product costs and improve the competitive position of economic units. Reducing costs is one of the most important strategies adopted by economic units to achieve competitive advantage and requires an integrated framework for cost management. Hence, the process of relying on traditional systems for measuring costs should be reconsidered. Therefore, the current research worked on adopting the use of modern methods for measuring cost, which is an input. Cost is based on attributes in response to the need of economic units for modern methods that are compatible with changes in the modern environment.

The current research, titled (An approach to measuring costs based on specifications with the aim of reducing costs), has designed its methodology to identify the basic problem represented by clarifying the cognitive foundations of costing technology based on specifications and its role in reducing costs, and by studying and analyzing the possibility of applying this technology in Iraqi industrial companies in achieving customer requirements and rationalizing resources and thus reduce costs

Introduction:

The developments taking place in the modern business environment at the present time are evident in intense competition, technological progress, openness of markets, and continuous change in customers' tastes and needs for products that suit their requirements with high quality and low prices. This has led economic units to consider reconsidering the traditional accounting systems and approaches applied in them due to the increasing criticism directed at them due to their inability to provide information that reflects the developments taking place in the business environment. This is because the core of their focus is the internal environment of these units, so it was important to search for modern strategic techniques. there is chance Cost and administrative accounting that meets the needs of customers and helps in cost management. By reducing it while improving the quality of the product, this will lead to achieving a competitive advantage for the economic unit. Perhaps the most prominent of these techniques is the cost technique based on attribute.

The costing technique based on attribute is one of the most important modern accounting techniques that aims to produce products that meet the customer's desire. In terms of attribute, price and functionality without affecting the quality of the product. In order to achieve success in applying the cost technique based on attribute, it requires appropriate information that helps in achieving the goal of managing the cost of resources and achieving accurate measurement of costs. This information is provided by applying the cost technique based on attribute, which depends on the principle of optimal exploitation of resources by allocating the cost on the basis of each A attribute of the product.

The research includes four main sections, as follows:

The first section: research methodology.
The second topic: The theoretical framework.
The third topic: the applied aspect.
Section Four: Conclusions and recommendations.

The first topic

Research Methodology

First: the research problem. Iraqi industrial companies face many problems, the most important of which is the high costs of their products compared to competing products. To what extent does contemporary cost technology affect reducing costs and achieving customer satisfaction? Are there sufficient elements available to apply cost technology based on specifications in Iraqi companies, which will reflect positively on reducing costs and thus achieving customer satisfaction and a competitive advantage for this product?

Second: The importance of research: The importance of the research comes from the importance of using strategic cost management techniques, including costing based on attribute and applying them in economic units because of their benefit in providing appropriate, efficient and high-quality information in the field of cost and administrative accounting that helps these units achieve their goals and ensure their survival under The intense competitive environment helps increase profits and customer orientation by reducing costs and determining the cost of each attribute.

Third: The Research Objectives:

1- Explaining the cognitive foundations of costing technology based on attribute and its role in reducing costs

-2 Study and analyze the possibility of applying this technology in Iraqi industrial companies to achieve customer requirements, rationalize resources, and thus reduce costs.

Fourth: The Research hypothesis:

The research is based on a basic hypothesis that: There is no impact of contemporary costing technology on reducing costs and raising the quality of products. Applying costing technology based on specifications leads to obtaining detailed operational information that helps management make the necessary decisions to rationalize resources and improve the quality of products at a low cost.

Fifth: Limits of research..

The spatial and temporal limits of the research can be clarified as follows:

_ Spatial boundaries of the research: Research sample: The Kufa Cement Factory was chosen.

_ Time limits for the research: We relied on the financial and cost data in the Kufa Cement Factory for the year (2022) for the purpose of fulfilling the applied aspect of the research. The year (2022) was chosen for the following reasons:

• Continue full production for this year.

• The delay and pauses that occurred during the rest of the year.

The second section:

The theoretical framework, the cognitive foundations of the costing technique based on attributes.

First: The concept of costs based on attribute. The costing based on specifications approach (ABCII) is a system developed for the activity-based costing system. Many writers and researchers have defined costs based on specifications. Some of them see costs as... The basis of specifications is the extent to which the attribute of a particular product match the requirements and desires of the customer, and some of them see it as the process of dividing the product into a set of characteristics and attribute for the purpose of determining the total cost of the product. It is considered a set of requirements for a customer who wants them to be met in the product or service, which is the real motivation for obtaining a specific product or service over others, which are offered by competitors to satisfy his needs and desires. These characteristics are represented by certain characteristics or features. (Al-Defafi, 2019: 46). He defined it as a technology that works to determine the specifications that make up the product and collect the costs inherent in those attribute to determine the unit cost of the product (Al-Samarrai, 2017: 97).

Second: Objectives of costing technology based on an attribute (ABCII):

According to (Sorour, 2017: 524) (Debusk & Chuk, 2014: 450)

1) Building an accounting information system that integrates efficiently with other information systems within the economic unit and contains information system components that ensure the possibility of application without obstacles.

2) Help provide information that will help estimate the cost of the product at an early stage of its life cycle.

3) Helping identify locations for achieving competitive advantage through clearly defining the distinctive characteristics and attributes of the product and balancing the cost of its production with its 4) Analyzing and studying the product through research and development processes to provide a link between customer requirements and needs and the optimal use of resources to achieve appropriate cost reduction and achieve profits.

5) Searching for transformations within the production and sales departments of the economic unit by submitting cost reports and knowing the extent to which these departments are able to apply standards in the production process while reducing costs in order to achieve the goals of the economic unit and Based on the desired attribute. value from the customer's point of view.

Third: Advantages of Specification-Based Costing (ABCII) technology:

There are several advantages that characterize the costing technique based on attribute, as follows: (Ibrahim, 2004: 14 (Sorour 2016, 95))

1) This technology is a translation of the customer's wants and needs in the form of attribute represented in the product unit.

2) It is an effective tool in rationalizing procedures and decisions related to analyzing product profitability due to the realistic results it provides.

3) ABCII technology achieves the market orientation philosophy that focuses on producing what can be sold and not selling what can be produced by manufacturing products that achieve value for the customer.
4) This technology is consistent with the philosophy of the just-in-time production system, where production is carried out according to the needs and requests of customers. This addresses the problem of inventory accumulation, and then reduces or completely avoids the cost of storage. This is consistent with the concept of the value chain, which considers that the cost of storage does not add value. For the product.
5) This technology helps achieve the greatest possible benefit for the economic unit. This is achieved by providing information that helps decision-makers focus more on the levels of achieving product specifications that achieve the greatest possible benefits for the economic unit while fulfilling the needs and desires of customers at the right time.

Fourth: Cost components based on attribute (ABCII):

The (ABCII) technology is based on a set of components, as long as its basic principle is that the product is a set of attributes and characteristics. Adding these attributes and characteristics requires conducting a group of activities, and the completion of these activities leads to the occurrence of costs. Therefore, the most important of these technical components (ABCII) are the following: (Attiya, 2004: 209-210) (Abboud, 2019: 503) (Saeed, 2015: 124).

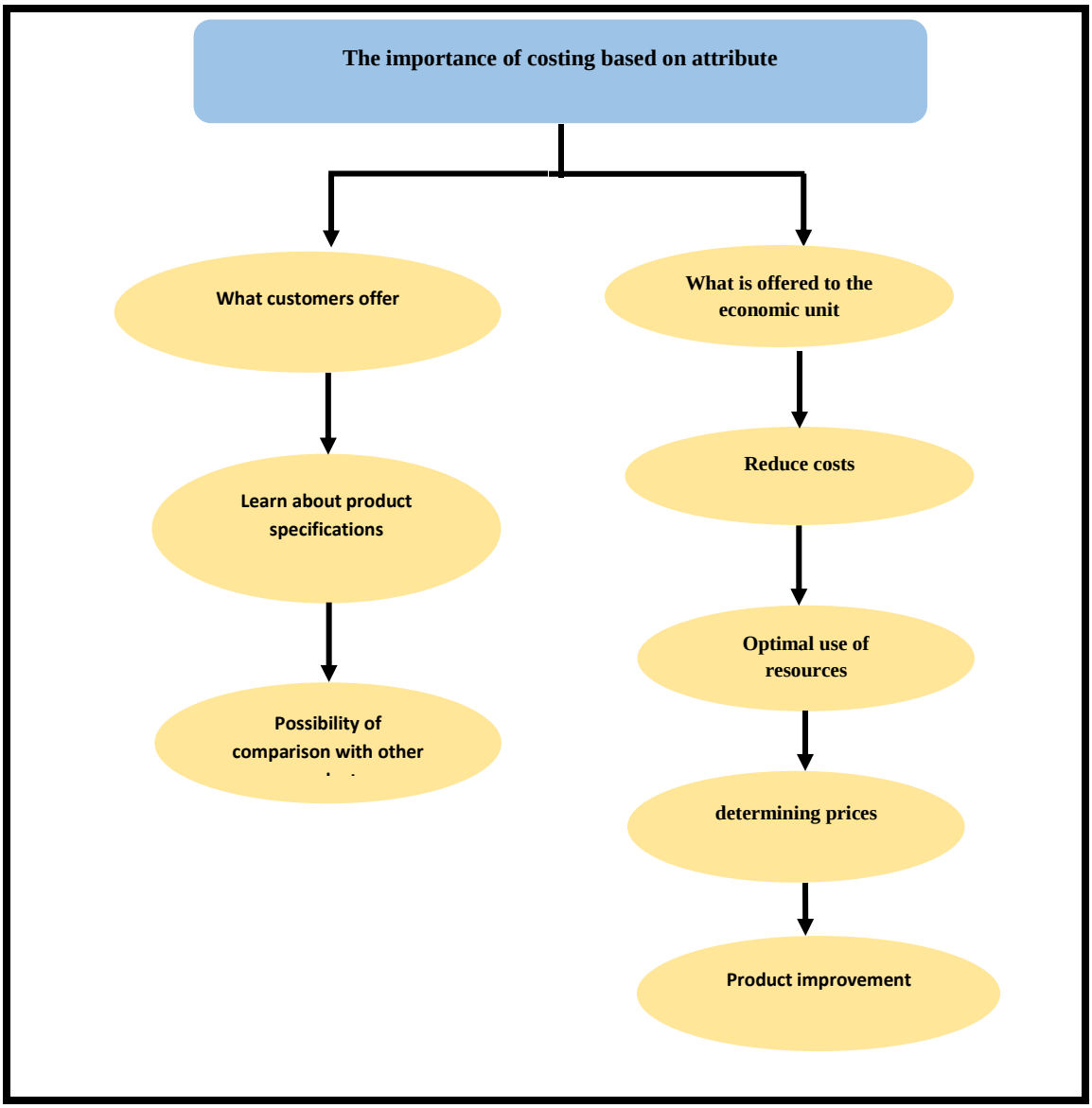
1- Production activities are directed to producing what can be sold, not selling what can be produced, by relying on the production of products according to the desired Cost components based on attribute, as it is considered a basis for measuring costs accurately, meaning it is concerned with knowing the needs of customers and considers it one of the priorities of its activity.
2 - Applying scientific methods in determining product Cost components based on attribute, such as joint analysis and value engineering, as it uses the value chain to determine the level of completion of each specification and the benefit of each level of completion of each Cost component based on attribute, as the cost necessary for its completion is determined, and through this, the cost and benefit of each unit of the product can be determined.
3-Analyzing the relationship between cost and benefit for each unit of the product. Thus, it is possible to know the number of levels of cost and benefit of the product units by summing the costs and benefits related to the levels of completion of each product specification.
4- Producers and customers try to reach some consensus about the attribute of the desired product or service in order to design it according to that consensus to make it more effective and efficient.
5- Using attribute methods to determine the attribute of the product or service, such as the value engineering method, to determine the product attribute that meet the needs of customers to choose the optimal alternative.

Fifth: The importance of costing technology based on attribute (ABCII):

The success of the economic unit depends on how to satisfy the needs and desires of customers by providing the best and keeping pace with rapid developments in the markets. This can only be done by following advanced costing systems that work to determine and measure the product's characteristics so as to provide a better product. With high, reduced attribute. At the same time, the economic unit can, by applying the ABCII technology, create value for customers by providing products with good attribute. Its importance is evident as follows:

1) The ABCII technology helps the management in the economic units plan the costs of the products or services provided by determining The levels of operation of each specification for the product or service so that the total cost of the attribute is then determined at each level of its operation (Al-Rubaie: 26:2015).
2) This technology analyzes the product into its specifications, showing the negative attribute that reduce the benefit of the product or service to the customer without competitors paying attention to these attribute, which leads the unit to study and analyze those attribute and how to get rid of them or improve them to enable it to obtain a competitive advantage (Al-Akidi, 2019:30).).
3) This technology helps in raising the quality of cost information by making the decision maker benefit effectively from the detailed information about the product attribute, given that this technology serves as a database for everything related to the product attribute (Zabin 94:2014)

Figure No. (1)The importance of applying attribute -based costing (ABCII) technology



Source: Prepared by the researcher

Sixthly:: Basic steps for applying costing based on Cost components based on attribute (ABCII):

To create a competitive advantage for the economic unit by offering customers something that competitors do not offer by providing the product or service with tangible and intangible Cost components based on attribute that match its desires and requirements (Hansen.et al;2009:378).

The first step: determining the needs and desires of customers:

It represents the first step in the value chain and is essential for knowing the competitive position of the economic unit. For this reason, these needs must be studied and analyzed with great attention to ensure that these requirements are correctly fulfilled in the unit's products or services (Berry, 1997: 94).

This step aims to achieve the following (Janji 2016: 32).

A- Programs contribute to planning and developing the unit's products or services in a way that achieves a balance between market needs and the optimal use of the resources available to the unit. B- It helps in drawing up the unit's production and marketing policies. T- Identifying and identifying deficiencies in meeting the aesthetic and usability needs of the product or service and taking them into consideration in the process of redesigning the product or service. C- It helps in determining the basic attribute of the product or service at the design stage.

The second step: Determine the basic Cost components based on attribute of the product and the relative importance of each specification: Specifications, as Walker pointed out, represent the main motivation for attracting the customer towards the product or service. It is necessary to determine and know how to implement these specifications, as these Cost components are based on attribute that are tangible or intangible, such as quality (durability). Reliability (safety), modernity (design), and service performance. Cost objectives are divided into a set of basic Cost components based on attribute, then costs are charged to the specifications and collected to find out the cost of the product per unit (Walker, 1998:26-27).

In order to determine the relative importance of each attribute, a questionnaire is prepared in which the basic specifications of the product or service are included by the engineers of the economic unit, which are specified in this step to arrange the technical and service specifications according to their relative importance to customers, then statistical operations are performed to find out the percentage of relative importance of each attribute according to the following table: (Al-Qurayshi, 55:2020).

Table (1)Relative importance of each attribute

Relative importance	attribute
%	**attribute A**
%	**attribute B**
%	**attribute C**
%	**attribute D**
%100	**the total**

The third step: Identifying and evaluating the alternatives for the levels of completion of each specification: After the basic Cost components based on attribute of the product or service have been determined, in this step the alternatives for the levels of completion for each of them are identified and then evaluated to achieve a balance between the unit's available capabilities on the one hand and competitors on the other hand, even though the reason for the multiple levels of completion is Each specification depends on the differences in customer preferences and the technology used in production. The choice is made from among these alternatives according to the perspective of cost and value for the customer. The method of value analysis is considered an appropriate method in this step to determine the specifications of the product or service and the activities that contributed to the implementation of those specifications, from preparing the raw materials until the product or service reaches the customer, in addition to studying alternative methods of production at the lowest cost. With attention to the factors that affect competitive advantage (Saeed: 2015: 130-131).

The fourth step: Determine the activities and processes necessary to implement the required specifications and their levels of achievement:

This is done by inventorying the activities to know the inputs and outputs of each process and studying the various performance measures related to the processes and the extent to which they add value in order to differentiate between activities that add value and those that do not add value by excluding unnecessary ones and working to improve the activities necessary for them to be effective (Al-Sayed, 2019: 462).

In order to determine whether activities add value or do not add value, it is necessary to know what each concept means. The activities that add value are those activities that, if cancelled, will affect the customer's perceived value, that is, the benefit gained from using the product or service, such as reliability and performance. As for the activities that do not add value It is divided into two parts: unnecessary activities and necessary activities. As for non-essential activities, they are activities that, if cancelled, do not affect the customer's perceived value, such as activities that cause defective products and machine malfunctions, and by excluding them, the costs of those activities will be reduced (Horngren, et al, 2015: 525).

Fifth step: Identifying resources for implementing activities and processes: The resources consumed by the activities specified in the previous step are identified and collected with the cooperation of the unit's management and all its departments, as identifying these resources depends on the accuracy of inventorying and identifying the activities and processes necessary to accomplish the Cost components based on attribute at their various levels through the efficiency and effectiveness of implementing (ABC) technology (Janhi 2016, :43) These resources are represented by technological equipment, raw materials, and others (Al-Jayushi 2019, 69).

Step Six: Determine the cost of completing each product characteristic:
In 1994, Partridge & Perren presented a clear scheme in which the product costs were divided according to the ABCII technique by analyzing those costs that are related to the Cost components based on attribute of the product and measuring the cost of each characteristic of the product. The cost of each characteristic of the product is measured according to The level of completion of each attribute, and dividing the cost into: costs related to the volume of production/costs related to activities / costs related to energy/costs related to non-industrial elements (Inglis, 2005:87) (Jasim, 2019:9).
Seventh:The role of cost reduction in Cost components based on attribute -based costing technology (ABCII)
The process of studying the reality of the market and identifying the desires of customers enables the economic unit to recognize the extent of customer demand for the product over other similar products, as well as to identify the prices of other products and any desirable qualities in the product that can achieve an increase in sales (Al-Defa'i, 8: 2019). . In a study, he pointed out that the role of (ABCII) is not limited to industrial units only, but rather the same advantages and results can be obtained in light of its application in service units, including units working in tourism and religious services. (ABCII) technology has provided great potential for providing information about customers' desires. The accuracy of measuring the cost of each desired characteristic reflects the possibility of achieving a percentage reduction in costs (7.6%) higher than it was under traditional cost measures (Azzez, 2020:6-7).

The third topic

Applying Cost components based on attribute -based costing (ABCII) technology in the Kufa Cement Factory to reduce costs

First: Applying the costing technique based on Cost components based on attribute in the Kufa Cement Factory:

For the purpose of applying the costing technique based on Cost components based on attribute in the Kufa Cement Factory by relying on the product Cost components based on attribute, it can be explained in several steps, which are as follows:
1) Determining the needs and desires of customers:
It means the ability of the product to respond to the expectations and desires of customers on an ongoing basis. Here, completing this step requires knowing the beneficiaries of the product and their desires, quickly and efficiently communicating with them, and anticipating possible changes in the Cost components based on attribute values from the customers' point of view. Through studying the market, it became clear that there is a need and desire for the resistant cement product from Before the customer due to its quality and type.
2) Determining the basic Cost components based on attribute of the product: The main Cost components based on attribute of the product, which constitute the main motivation for purchasing the product, are determined according to the laboratory's point of view in determining those Cost components based on attribute on the basis of which the product was designed and manufactured. After studying the product and interviews conducted by the researcher with the engineers in the laboratory, the researcher concluded that the main Cost components based on attribute Of the product are:
- Color:
- Resistant to sulfates and salts:
- Moisture resistance:
- Cohesive strength:
- Bag durability:
- Availability of distributor agents.

3) Identify the product parts associated with each Cost component based on attribute
By using the engineering expertise present in the laboratory and through field experience, the researcher was able to determine the parts of the resistant cement related to it according to the Cost components based on attribute required by customers, as follows:

Table (2)Parts and Cost components based on attribute associated with resistant cement

Availability Agents Distributors	Bag durability	Cohesion strength	Resistance For moisture	istant to sulfates and salts	the color	the details
14.1%	11.3%	15.2%	16.4%	17%	9.8%	Limestone

14.1%	11.3%	15.2%	16.4%	17%	9.8%	Ordinary dirt
14.1%	11.3%	15.2%	16.4%	17%	9.8%	Iron dust
14.1%	11.3%	15.2%	16.4%	17%	9.8%	sand
14.1%	11.3%	15.2%	16.4%	17%	9.8%	gypsum
14.1%	11.3%	15.2%	16.4%	17%	9.8%	Clinker
100%	-	-	-	-	-	the total

The table above shows the product Cost components based on attribute according to the proportions included in the composition of resistant cement and for each of the above Cost components based on attribute. As each of these percentages means achieving a specific Cost component based on attribute, such as the limestone material being the first basic material for the formation of the cement product, it fulfils the price Cost components based on attribute at a rate of (16.2%), while the remainder is for the color specification at a rate of (9.8%), and with a rate of (17%) it is for the sulfate resistance Cost components based on attribute. And salts, while the moisture resistance Cost components based on attribute is (16.4%), the cohesion strength Cost components based on attribute is (15.2%), and also the bag durability Cost components based on attribute and the availability of distributed agents are (11.3%) (14.1%), respectively.

4) Calculating the costs of the product Cost components based on attribute for the product: The total cost of each Cost components based on attribute of the resistant cement product was determined as follows:

Table (3)Calculating attribute costs

Availability Agents Distributors	Bag durability	esion strength	Resistance For moisture	istant to lfates and salts	the color	ost of cement produced	the details
14.1%	11.3%	15.2%	16.4%	17%	9.8%	3,404	Limestone
14.1%	11.3%	15.2%	16.4%	17%	9.8%	764	Ordinary dirt
14.1%	11.3%	15.2%	16.4%	17%	9.8%	5,807	Iron dust
14.1%	11.3%	15.2%	16.4%	17%	9.8%	487	sand
14.1%	11.3%	15.2%	16.4%	17%	9.8%	231	gypsum
14.1%	11.3%	15.2%	16.4%	17%	9.8%	8,640	Clinker

Table (2) shows a distribution of the weights of cement components according to the proportions of each product attribute, then summing the amounts of the components of each specification to arrive at the costs of each attribute separately. Then the researcher calculated the costs according to the attribute for each specification of the resistant cement. The cost of the raw material for the limestone is multiplied by the ratio of the attribute to the color and so on for the rest (3,404 * 9.8% = 33,359 dinars).

The cost of the raw material for ordinary dirt is multiplied by the percentage of the specification, resistance to sulfates and salts, and so on for the rest

(3,404 * 17% = 54,868 dinars) as shown in the following table:

Table (4)The cost of each attribute of resistant cement

Availability Agents Distributors	Bag durability	Cohesion strength	Resistance For moisture	Resistant to sulfates and salts	the color	the details
47,996	38,964	51,740	57,868	54,868	33,359	Limestone
10,772	86,332	11,613	12,988	12,988	7,4872	Ordinary dirt
81,879	65,619	88,266	98,719	98,719	57,909	Iron dust
68,667	55,031	74,024	8,279	8,279	4,773	sand
45,261	26,103	35,112	3,927	3,927	2,2638	gypsum
12,182	97,632	13,133	14,688	14,688	84,672	Clinker
266,757	369,681	273,888	196,469	193,469	242,223	the total

5) Determine the cost of the product based on attribute: Determine Product Cost :

The final product cost was calculated by summing the cost of each product attribute as follows: Total attribute costs = Total costs of the color attribute + Total costs of the sulfate and salt resistance attribute + Total costs of the moisture resistance attribute + Total costs of the cohesion strength attribute + Total costs of the bag durability attribute + The total cost of specifying the availability of agents and distributors.

Table (5)Comparison between the cost before applying the ABCII technology and after applying the ABCII technology.

Cost reduction percentage	The amount of cost reduction	Cost after applying the (ABCII)technique	Cost before applying the (ABCII)technique	the details
0.9998720236	2,225,087,647	284,795	2,225,372,442	Limestone
0.9995804696	499,313,299	209,565	499,522,864	Ordinary dirt
0.9998706692	3,796,810,866	491,108	3,797,301,974	Iron dust
0.9993124483	318,379,550	219,053	318,598,603	Sand
0.9990945874	151,139,936	136,968	151,276,904	Gypsum
0.4219498301	23,839.46330	236,995	5,649,833,605	Clinker
0.9998751387	12,640,327,908	1,578,484	12,641,906,392	the total

From what was stated above, it can be said that applying the ABCII technique leads to obtaining detailed operational information about product attribute that helps management make the necessary decisions to rationalize resources and improve product quality at a low cost.

Section Four: Conclusions and recommendations

Conclusions:

1-The rapid technological development has affected the assortment of products, as the products have varied and their attributes have differed, which has led to a deficiency in traditional systems in accurately determining the cost of these products.

2- The ABCII approach helps in cost planning by determining the levels of completion of each attribute and then determining the total product cost by summing up the attribute costs.

3-The cost information provided by the traditional cost system differs from the cost information provided by the ABCII technology, as a result of the accuracy of this technology, especially with regard to the costs of raw materials and direct labor costs. Therefore, we find a reduction in cost when applying this technology.

Recommendations:

1- The need for the research sample company to study the market and follow promotional and advertising policies with the aim of increasing sales, which is reflected in reducing the fixed costs of the product, and continuous communication with customers with the aim of knowing the attribute they require that achieves the desired value from the customer's point of view.

2- Applying cost technology based on attribute to reduce costs through an integrated methodology between them on the attributes product of the research sample factory with the aim of reaching the production of a product that meets market and customer requirements with high quality, low cost, reducing response time and achieving optimal use of resources, which contributes to achieving competitive advantage.

3- Seeking the assistance of qualified persons with practical and scientific experience in the field of accounting and applying modern cost techniques to train cadres and workers on how to use management accounting techniques.

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